

What is claimed is:

1. A system for processing workpieces, comprising:

a frame;

a deck on the frame;

5 a plurality of processor locating elements on the deck;

a plurality of workpiece processors on the deck;

a robot moveable between the processors, for loading and unloading
workpieces into and out of the processors; and

with substantially each processor having two or more locating
10 elements, with each locating element engaging a deck locating element on the
deck, to locate the processors on the deck with sufficient precision to allow
replacement of a processor and operation of the system without a need to
recalibrate the robot.

2. The system of claim 1 further comprising a robot track supported on
15 the frame, and with the robot moveable along the robot track.

3. The system of claim 1 with at least one of the processors comprising a lower rotor, and with the engagement of the mounting ring and the processor locating elements positioning the lower rotor of the processor to within +/- 0.02 inches relative to the position of the robot.

5 4. The system of claim 1 with the deck comprising a top panel and a bottom panel, and bracing attaching the top panel to the bottom panel.

5. The system of claim 1 wherein the locating elements comprise tapered pins.

6. The system of claim 1 wherein the locating elements comprise
10 openings in the deck adapted to engage with pins on the mounting ring of the processors.

7. The system of claim 1 wherein the robot is moveable along a rail structure rigidly attached to the frame.

8. The system of claim 1 wherein the processors are interchangeable
15 without recalibration of the robot.

9. The system of claim 6 further comprising a bushing in one or more of the openings.

10. The system of claim 1 with the frame including first and second plates joined to the deck, and first and second interior side plates joined to the deck and to the end plates.

11. The system of claim 10 further including first and second outer side
5 plates joined to the deck and to the first and second end plates.

12. The system of claim 11 further comprising a platform joined to the first and second end plates and to the first and second interior side plates, and with the robot moveable on a track on the platform.

13. The system of claim 1 wherein the processors are arranged in first
10 and second parallel columns and with the robot moveable linearly between the columns.

14. A system for processing workpieces, comprising:

a frame;

a deck on the frame;

15 a plurality of workpiece processor positions on the deck;

a robot moveable between the processor positions; and

locating means for locating a first processor or a second processor at one of the processor positions on the deck with sufficient precision so that the robot can load and unload workpieces into the first or second processor, without recalibrating the robot.

5 15. The system of claim 14, with the locating means comprising a mounting ring on the first and second processors engaging two or more locating elements on the deck, to precisely locate the processor on the deck.

 16. The system of claim 14 with the locating means comprising at least two precision locating elements on each of the first and second processors, and at
10 least two complementary precision locating elements on the deck at one of the workpiece processor positions.

 17. The system of claim 14 with the locating means including a rigid connection between robot track, on which the robot moves, and the deck.

 18. A method for operating a workpiece processing system, comprising
15 the steps of:

 removing a first processor from a first position on a support surface of the system;

installing a second processor into the first position in the system;

precisely locating the second processor in the first position by
engaging first and second precision locating elements on the second processor with
first and second precision locating elements on a support surface of the system;

5 and

moving a robot to load and unload a workpiece into and out of the
second processor, without recalibrating the robot.

19. A system for processing workpieces, comprising:

a processor having an upper fluid outlet;

10 a valve assembly;

a fluid supply line extending from the valve assembly into the
processor, to supply fluid to the upper fluid outlet;

a first and second valves in the valve assembly;

a first liquid source connecting to the first valve, for supplying a first
15 fluid to the processor; and

a pump connecting to the second valve, for pumping the first fluid out of the supply line and back to the first fluid source.

20. The system of claim 19 with the pump comprising:

an inlet check valve;

5 an outlet check valve;

an air pressure operated bellows; and

a spring associated with the bellows.

21. The system of claim 20 wherein at least one of the inlet and outlet check valves includes a ball which seals against a valve seat only via fluid
10 pressure.

22. A system for processing workpieces, comprising:

a processor;

a valve assembly;

a fluid supply line extending from the valve assembly into the
15 processor;

a first, second, third and fourth valves in the valve assembly;

a first liquid source connecting to the first valve, and a second liquid source connecting to the second valve;

a pump connecting to the third valve, for pumping one of the first
5 and second fluids out of the supply line; and

an aspirator connecting to the fourth valve.

23. A method for processing a workpiece, comprising the steps of:

placing the workpiece in a processor;

spinning the workpiece;

10 opening a first valve to supply a first liquid to the spinning workpiece via a liquid supply line;

closing the first valve;

opening a second valve connected to a suction pump;

actuating the pump to draw the first liquid out of the supply line and
15 into a first liquid source;

turning the pump off;

closing the second valve;

opening a third valve to supply a second liquid to the spinning
workpiece;

5 closing the third valve; and

opening a fourth valve connected to an aspirator, to draw the second
liquid out of the supply line and into a drain line.